

GENERATING THREE-DIMENSIONAL IMAGES USING  
IMPULSIVE RADIO FREQUENCY SIGNALS

ABSTRACT OF THE DISCLOSURE

Generating an image matrix includes accessing a round-trip time matrix for a space having points. The round-trip time matrix describes an estimated round-trip  
5 time for a signal to travel from a transmit antenna, to a point, and to a receive antenna. Signals reflected from an object of the space are received at the receive antennas. The following are repeated for at least a subset of the points to generate an image matrix: select  
10 a point of the subset of points; for each receive antenna, establish a waveform of a signal received by a receive antenna and identify a waveform value of the established waveform that corresponds to the selected point according to the round-trip time matrix; and  
15 combine the waveform values for the selected point to yield an image value for the selected point. The image matrix is generated from the image values.